

## NISTTech

### Adaptable Anomaly Detector

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#### Multi-channel coincidence detector reduces costs and data storage requirements by selectively recording atypical events

##### Description

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The multi-coincidence extractor system selectively records abnormalities in a patterned sequence of events of electronic data, for example, medical EKG's or security system monitoring points. The system is aware of "typical" occurrences within the process it is trained on; once something breaks this pattern, the recording device is triggered immediately to monitor the chain of events and alert the attached PC or other electronic device. Only anomalies trigger data recording, permitting the system to run over longer periods of time using less memory and maintaining all pertinent data. The multi-coincidence detector stores hundreds of millions of atypical events in an easily manageable data format. This technology can be adapted to many other types of data recording and quality control as demonstrated by the two descriptions below.

The multi-coincidence extractor processes hundreds of millions of events per second and filters them to a small data stream that an end user can easily handle. It records starts only when necessary, allowing the use of limited memory volume without sacrificing any important data. The user's PC or other electronic device is notified when their event has occurred. The device is easily configurable so it cuts time and investment for developing new devices or extracting old information.

**Health Monitor Save-It:** A portable device could collect data from many different sensors to target a variety of health issues, such as electrical signals (electroencephalography, electrocardiography), sound (heart beat), and pressure sensors (external contraction monitoring). The convenient device connects with any PC. On-demand recording saves laboratory and doctors' time and allows the doctor to send the patient home to "catch" and record symptoms that occur sporadically, giving the doctor a better diagnostic tool.

**Threat Finder:** Receive real-time alerts from remotely monitored processes (widgets on an assembly line, a critical machinery part that could fault, or entry to your home/ business) about an uncharacteristic feature (a processing blunder, corrosion, an intruder) with a time stamp that lets you know precisely when that anomaly was detected. Detection sensitivity picks up the slightest imperfection or deviation. This device could "learn" what "normal" should be for your circumstances and alert you whenever something is awry.

Home/ business intrusion detection and manufacturing processing and quality control are just a couple of areas where real-time notification of abnormal digital signal could allow a user to be alerted to deviations from "normal" situations.

##### Applications

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- **Medical monitoring**  
Portable device to identify anomalies in vital signs such as pressure, EEGs, EKGs, and other symptoms collected by medical monitoring equipment
- **Manufacturing**  
Emergency shut-off and quality control - monitors production lines, machine processes, products and materials
- **Security systems**  
Monitors anomaly activated security systems for unusual events
- **Research laboratories**  
Precise data recording for laboratory trials

##### Advantages

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- **Low cost**  
Reduces specific requirements of external hardware and technology so systems can be mass produced for many types of sensing
- **Works with ANY PC**  
No system requirements
- **Compact and portable**  
The all inclusive sensing platform fits within a traditional playing card box
- **Rapid processing speeds**  
Processes hundreds of millions of events per second and compiles them into an easy to understand information stream for the test-reader
- **Selective data recording**  
Only anomalies trigger data recording permitting longer trials and using less memory
- **Improved quality control**  
Precisely predicts differences in quality

## Abstract

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Embodiments of the present invention provide an inexpensive and fast pulse characterization platform capable of real time operation, suitable for acquisition of single-photon data. Embodiments of the present invention include both a digital multi-channel data acquisition instrument and an analog pulse acquisition instrument suitable for a wide range of applications in physics laboratories. An FPGA performs multi-channel acquisition in real time, time stamps single events and determines if the events fit a predetermined signature, which causes the events to be categorized as a coincidence. The indications of coincidences are then communicated to a host computer for further processing as desired.

## Inventors

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## Related Items

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- MERWYN Business Simulation Report
- MERWYN Business Simulation Report

## References

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- Serial #12/354,516 file date 01-15-2009
- Docket: 08-012

## Status of Availability

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available for licensing

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